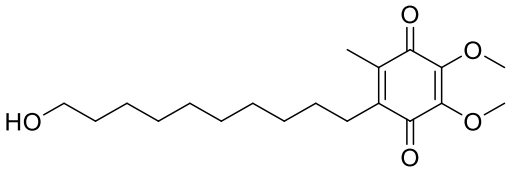
Product data sheet

MedKoo Cat#: 329671 Name: Idebenone CAS#: 58186-27-9 Chemical Formula: $C_{19}H_{30}O_5$ Exact Mass: 338.2093 Molecular Weight: 338.444	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Idebenone, also known as CV 2619, ss a drug that was initially developed by Takeda Pharmaceutical Company for the treatment of Alzheimer's disease and other cognitive defects. As of December 2013 the drug is not approved for these indications in North America or Europe, but it is approved for the treatment of Leber's hereditary optic neuropathy (LHON) in Europe.

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
DMSO	68	200.92
Ethanol	68	200.92

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	**1 mg**	**5 mg**	**10 mg**
1 mM	2.95 mL	14.77 mL	29.55 mL
5 mM	0.59 mL	2.95 mL	5.91 mL
10 mM	0.30 mL	1.48 mL	2.95 mL
50 mM	0.06 mL	0.30 mL	0.59 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Yan A, Liu Z, Song L, Wang X, Zhang Y, Wu N, Lin J, Liu Y, Liu Z. Idebenone Alleviates Neuroinflammation and Modulates Microglial Polarization in LPS-Stimulated BV2 Cells and MPTP-Induced Parkinson's Disease Mice. Front Cell Neurosci. 2019 Jan 9;12:529. doi: 10.3389/fncel.2018.00529. PMID: 30687016; PMCID: PMC6333870.

2. Peng J, Wang H, Gong Z, Li X, He L, Shen Q, Pan J, Peng Y. Idebenone attenuates cerebral inflammatory injury in ischemia and reperfusion via dampening NLRP3 inflammasome activity. Mol Immunol. 2020 Jul;123:74-87. doi: 10.1016/j.molimm.2020.04.013. Epub 2020 May 18. PMID: 32438202.

In vivo study

1. Yan A, Liu Z, Song L, Wang X, Zhang Y, Wu N, Lin J, Liu Y, Liu Z. Idebenone Alleviates Neuroinflammation and Modulates Microglial Polarization in LPS-Stimulated BV2 Cells and MPTP-Induced Parkinson's Disease Mice. Front Cell Neurosci. 2019 Jan 9;12:529. doi: 10.3389/fncel.2018.00529. PMID: 30687016; PMCID: PMC6333870.

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2. Peng J, Wang H, Gong Z, Li X, He L, Shen Q, Pan J, Peng Y. Idebenone attenuates cerebral inflammatory injury in ischemia and reperfusion via dampening NLRP3 inflammasome activity. Mol Immunol. 2020 Jul;123:74-87. doi: 10.1016/j.molimm.2020.04.013. Epub 2020 May 18. PMID: 32438202.

7. Bioactivity

Biological target:

Idebenone (CV-2619) is a synthetic analog of coenzyme Q10 (CoQ10) and a brain stimulant.

In vitro activity

To detect the potential cytotoxicity of idebenone, the dose-dependent effects of idebenone (1, 2.5, 5, 7.5, 10, and 20 μM) on the survival of BV2 microglial cells was analyzed. The result demonstrated that idebenone was not cytotoxic to BV2 microglial cells at 1, 2.5, or 5 μM (Figure 1A). Activated microglia release various proinflammatory cytokines, NO and superoxide (Shao et al., 2013). The effects of idebenone on LPS-activated BV2 cells was then investigated. The data showed that idebenone (1, 2.5, and 5 μM) dose-dependently decreased the LPS-stimulated production of NO ($p < 0.01$; Figure 1B) and suppressed the mRNA expression of IL-6, IL-1β, TNF-α, and iNOS in LPS-stimulated BV2 cells ($p < 0.05$; Figure 1C). As shown in Figure 1, the most inhibition was observed at the concentration of 5 μM. Idebenone had little impact on microglia polarization in resting state, while it could suppress the expression of M1 markers ($p < 0.05$; Figure 2A) and promote activated microglia to alternatively M2 phenotype in conditions of inflammatory stimulation, as demonstrated by the increased expression of Arg-1, CD206, and YM (M2 markers) ($p < 0.05$; Figure 2B).

Reference: Front Cell Neurosci. 2019 Jan 9;12:529. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/30687016/

In vivo activity

Experimentation was conducted to identify whether idebenone treatment affected MPTP-induced dopaminergic neuronal death and neurobehavioral deficits. Mice received idebenone showed no visible disorders such as reduced appetite, infection, or inhibition of motor activity. The open field test and pole test are useful methods for evaluating the motor dysfunction caused by PD. For open field test, the mice's paths on the 3rd and 7th days were mapped, which were recorded as the total distance mice traveled in 5 min. MPTP-treated mice that were pretreated with corn oil moved around the arena very little, compared with MPTP-treated mice that received idebenone (3 days: $p < 0.01$; 7 days: $p < 0.001$; Figures 5A,B). Corn oil-MPTP-treated mice demonstrated decreased locomotor activity, crossing fewer lines than corn oil-saline-treated mice (3 days: $p < 0.001$; 7 days: $p < 0.001$; Figures 5A,C). Idebenone-MPTP treated mice crossed more lines than corn oil-MPTP-treated mice (3 days: $p < 0.01$; 7 days: $p < 0.01$; Figures 5A,C). For the pole test, the time to descend for the corn oil-MPTP group was markedly prolonged compared with the corn oil-saline group (3 days: $p < 0.001$; 7 days: $p < 0.01$; Figure 5D). However, the time to descend of the idebenone-MPTP group was shortened to 8.69 ± 0.64 s (3 days, $p < 0.01$; Figure 5D), and 6.97 ± 0.54 s (7 days, $p < 0.05$; Figure 5D) compared with the corn oil-MPTP group.

Reference: Front Cell Neurosci. 2019 Jan 9;12:529. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/30687016/

Note: The information listed here was extracted from literature. MedKoo has not independently retested and confirmed the accuracy of these methods. Customer should use it just for a reference only.